ABSTRACT

In a fuel cell system and its controlling method, the fuel cell system includes a stack 21 including fuel cells 11 each having a polymer electrolyte membrane 13, and a controller 61. The controller 61 is responsive to detected outputs of a displacement sensor 27 and a temperature sensor 27 and controls such that, when the polymer electrolyte membrane 13 is discriminated to remain in an excessively dry state, a shut-off valve 37 is applied with a "close" control signal to interrupt the supply of fuel gas to the stack 21 and, concurrently, a shut-off valve 41 is applied with an "open" control signal to allow air to be supplied to the stack 21 while applying a pump control signal to a pump 57 so as to maximize its rotational speed for thereby increasing the flow rate of pure water 59 to be circulated to the humidifier 35 from a pure water tank 55. Simultaneously, a timer of the controller 61 is operated to begin counting an incremental time. As a result, air is excessively humidified by the humidifier 35 and is supplied to the stack 21 via the shut-off valve 41.